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Handbook N° 81671, G.

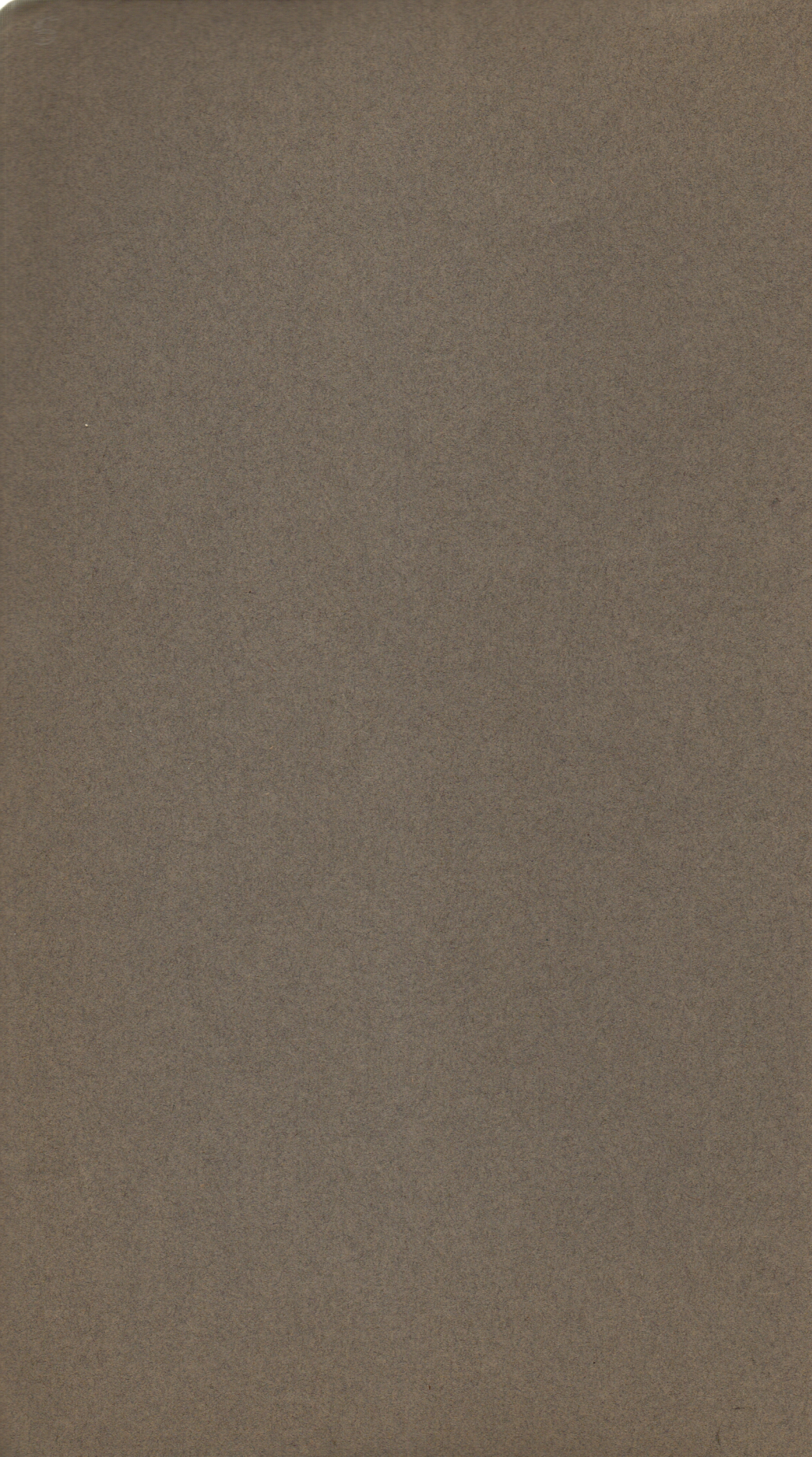
H. J. WOODEND

Vickers-Berthier Light Machine Gun.

Model, 1924-25.

Vickers Limited.

London.



Handbook N° 81671, G.

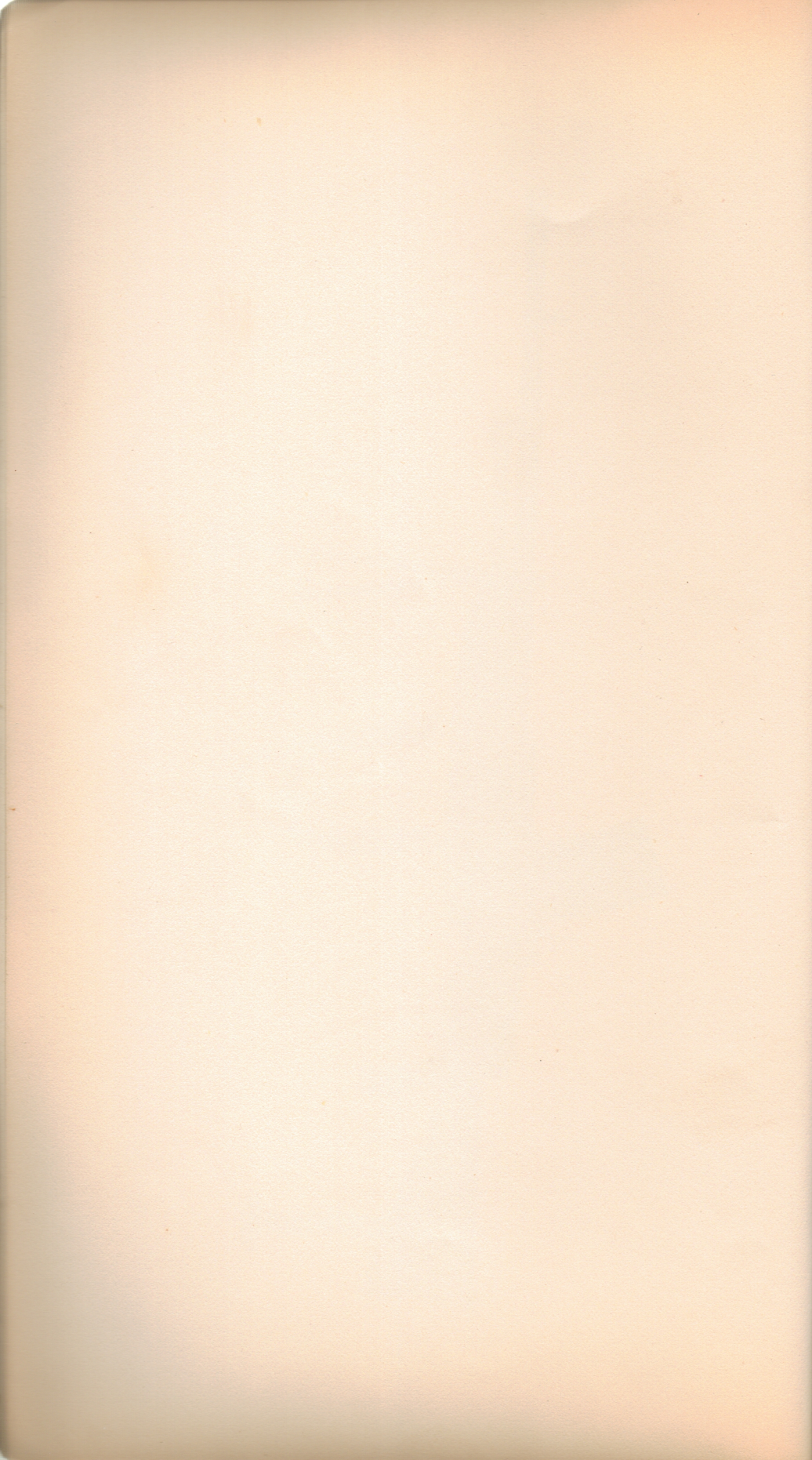
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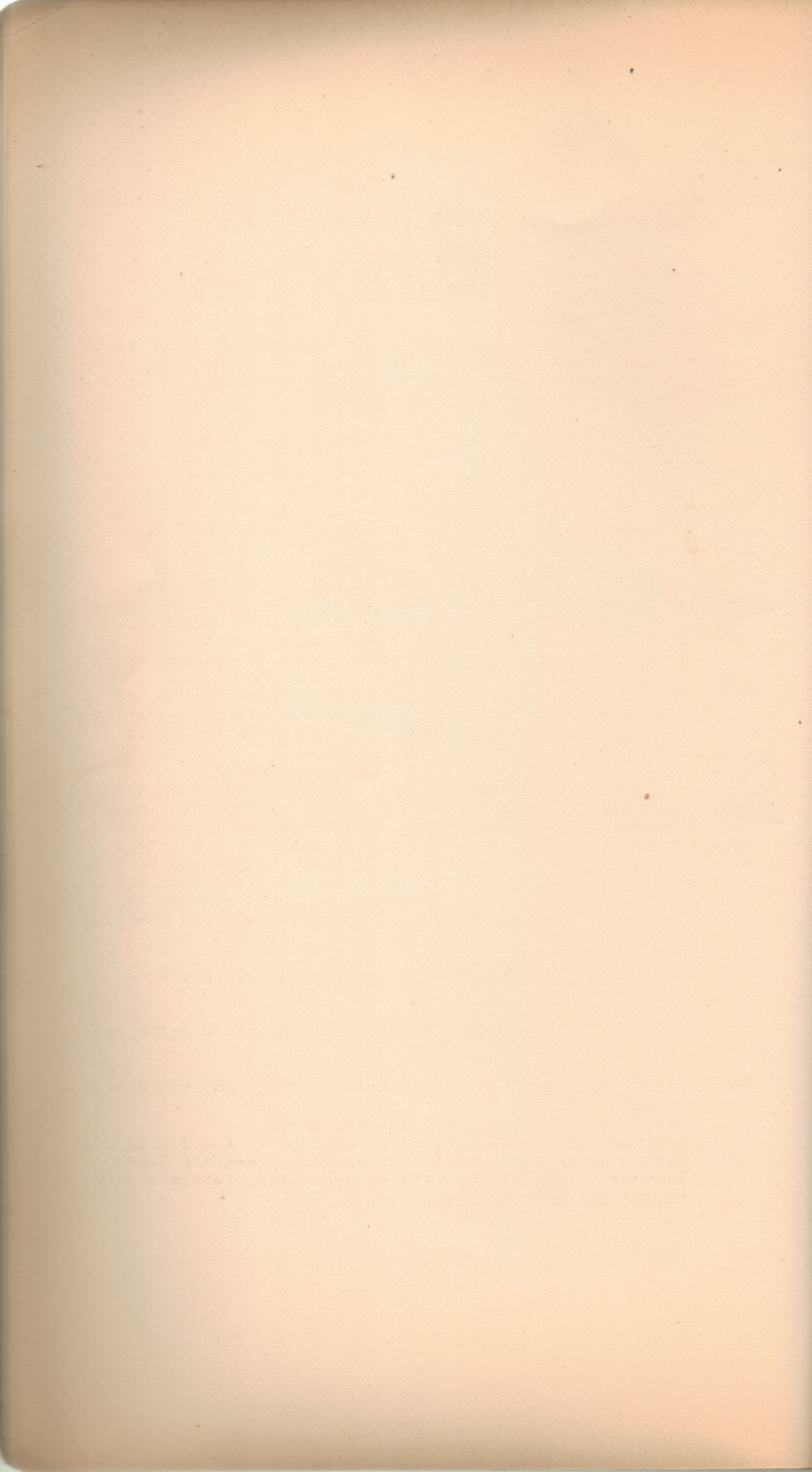
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VICKERS BERTHIER LIGHT MACHINE GUN

MODEL 1924-25.

(PLATES I & II.)

The Vickers Berthier Light Machine Gun is of the gas operated type in which a portion of the highly compressed gas, generated by the explosion of the charge, is used to operate the breech mechanism.

The characteristic features of the gun are, its gentle recoil and the extreme simplicity of its breech mechanism. The various parts can be dismounted without the use of tools and cannot be assembled incorrectly. The breech mechanism is completely covered in and protected from possible damage and there are no projecting knobs or handles that fly back and forwards as the gun fires.

The barrel is easily detachable, and when overheated can be changed in 5 seconds, without actually handling, and without the necessity of dismounting other parts of the gun. The weapon can be completely stripped for cleaning in 35 seconds and re-assembled in 75 seconds.

The gun will fire single shots like a rifle, or by a single movement of a finger lever on the trigger gear, it can be instantly converted into a fully automatic light machine gun, or set to "Safe" as desired.

The gun is usually fired with the gunner in the prone position, in which case the barrel is supported at a convenient height on two legs. This arrangement generally gives sufficient accuracy, but for shooting at the longer ranges a small elevating gear is supplied, which can be fitted under the butt. The gun can also be fired from the shoulder, with the gunner standing, or fired from the hip, and at any angle of elevation or depression without changing the adjustment of any parts.

Magazines for 20 or 30 rounds are provided.

The MACHINE-RIFLE can be divided into 5 principal sections, viz.-

- I. Barrel with gas block, regulator, fore sight and flash tube;
- II. Receiver with rear sight and ejector;
- III. Locking block with extractor, gas piston and firing pin;
- IV. Piston guide with handguard, cocking piece and legs;
- V. Butt with butt block, trigger mechanism, return spring, buffer and rear support.

VICKERS BERTHIER LIGHT MACHINE GUN

MODEL 1924-25.

PARTICULARS.

Calibre)		
Muzzle Velocity)	)	.....	Same as Infantry Regulation Cartridge.
Length of Barrel (without Flash Tube)	.....	23.2 in.	600 m/m.
Overall Length of Gun	.....	48.6 in.	1235 m/m.
" Height to top of 20 round Magazine (from ground)	...	18.9 in.	480 m/m.
Height of Barrel from the Ground	...	11.65 in.	305 m/m.
Weight of Barrel with Fittings (complete)	.....	6 lbs.	2.728 kgs.
" " Gun with Front Support (approx.)	.....	20.9 lbs.	9.5 kgs.
" " 20 round Magazine (empty).		0.6 lbs.	0.278 kgs.
" " " " " (full)		1.6 lbs.	0.75 kgs.
" " Rear Support	.....	1.3 lbs.	0.59 kgs.

Rate of Fire.

About 450 rounds per min. automatically while ammunition in magazine lasts.

About 250 rounds per min. including time taken to change magazines.

GENERAL DESCRIPTION.

- I -

Barrel.

The barrel (plate III) consists of the barrel proper with rifled bore and cartridge chamber. It is secured to the receiver by radial lugs formed on the barrel and engaging with corresponding recesses cut in the receiver and finally retained by a hook on the barrel, engaging with a similar hook formed on the piston guide. The guide is actuated to secure or release the barrel by turning the barrel locking pin on the left of the receiver.

The barrel has formed on it, heat radiating fins, and is provided with a flash tube and foresight at the muzzle end.

A little beyond the centre, the barrel is fitted with a gas block provided with a gas regulator. The gas block connects with the front end of the piston guide, thus forming a rigid connection between the barrel and piston guide.

- II -

Receiver.

The receiver (plate III) forms the body of the gun and contains the locking block and ejector. It guides the rear end of the gas piston, and supports the butt and trigger mechanism, which is secured to it by a pin. It also supports the wooden handguard which serves to protect the hand from a heated barrel.

The top of the receiver has an opening immediately behind the barrel to receive the mouth of the magazine, which is secured by a spring catch. Mounted immediately behind the magazine opening is the breech catch which projects into the receiver, for the purpose of holding the mechanism in the open position when the catch is depressed by the magazine platform, which movement takes place after the last cartridge has left the magazine. The act of removing the magazine releases the breech catch and liberates the mechanism, which moves forward on to the trigger sear. The magazine opening can be completely closed with a dust cover during transport of the gun.

Ejector.

The ejector (plate IV) is pivoted on the left side of the receiver and retained in position by a cover. During the rearward movement of the mechanism a cam groove formed in the locking block, forces the rear end

of the ejector outwards, so that the toe on its front end swings inwards behind the cartridge case held by the extractor, and ejects it to the right through the ejection slot; the ejection slot is also provided with a protective cover for transport, which, when closed, engages with the cocking handle so that the action of cocking the gun withdraws the cover to the open position.

Gas Piston.

The gas piston (plate IV) extends to the gas block, underneath the barrel, and is supported by, and travels in the piston guide. A cocking piece is mounted in the piston guide, and arranged to slide along the right side of the receiver when withdrawn by hand to cock the gun.

Rear Sight.

The rear sight is mounted on a bracket, dovetailed on the left side of the receiver, and consists of a vertical toothed rack provided with the usual form of V slot. The sight is elevated by turning a small milled drum which, together with the sight stem, is graduated up to 1,600 metres.

- III -

Locking Block.

The breech locking block (plate IV) consists of the breech locking block with extractor. The locking block is locked in the firing position by receiving a tilting movement from the piston rod during its forward movement, which raises its back end in front of a locking shoulder let into the top of the receiver.

The locking block is rectangular in section, and hollowed underneath to take a pillar projecting upwards from the piston rod. This pillar carries a fixed firing pin, and is provided with two side horns, which engage in inclined grooves formed inside the locking block, and cause its rear end to rise or fall as the pillar moves along the block.

Extractor.

The extractor is mounted in the right hand side of the locking block, and is forced forward by a powerful spring coiled round its rear end; while the front end, which inclines inward, is provided with a claw to engage with the cartridge rim.

Piston Guide.

The piston guide (plate IV) which connects the gas block to the front end of the receiver, serves to guide the piston during its backward and forward travel. In addition, it is fitted with a gas check to prevent fouling of the receiver. The right side of the piston guide is slotted for half its length to receive the cocking piece which has a toe projecting inwards at its forward end to engage in front of a similar toe formed on the gas piston.

Handguard.

The handguard (plate III) is of wood. It is secured to the piston guide and supported at the rear end by the receiver. The handguard extends forward along the piston guide to cover the cocking piece and forms a convenient grip for the left hand, when firing from the hip. A light steel plate is interposed between the barrel and the handguard to protect the latter from heat. "The plate is held on the handguard by screws and should not be removed."

Front Support.

The two legs forming the front support are hinged to a bracket, which swivels on the piston guide just in front of the handguard. When not required, the legs can be pulled outwards to unlock the hinge and then folded up alongside the barrel.

Butt.

The butt (plate III) is of wood, recessed at the top to receive the return spring tube and is fitted with a butt plate provided with an eye for the carrying sling. The front part of the butt fits into a butt block.

Buffer.

A powerful spring buffer is mounted on the front face of the butt to arrest the mechanism at the end of its opening travel.

Return Spring.

The mechanism return spring (plate III) recoils in the tube mounted on the top side of the butt and extends along the lower part of the receiver, so as

to press against the back of the piston.

Trigger Gear.

The trigger gear (plate V) is mounted in the front end of the butt-block and arranged so that the trigger sear can engage with the sear on the piston and hold it in the retracted position; the trigger lever and trigger sear are held on trunnions in the trigger frame, the trigger sear being situated immediately over the trigger lever with its rear end bent downwards and adapted with a spring pawl to engage with the rear portion of the trigger lever.

A fire control lever is mounted in the trigger frame immediately in front of the trigger.

Single Fire.

When set to the single-fire position the trigger lever can move far enough to bring the trigger sear out of engagement with the piston; the spring pawl then slips off a step formed on the trigger lever and allows the sear to rise and re-engage with the piston on its return.

Automatic Fire.

For automatic fire the control lever is turned until the recess cut in its stem coincides with the projecting tail of the trigger lever; in which position, the trigger lever is able to move through a greater distance. A prolonged pull on the trigger lever holds the sear well out of engagement with the piston, which is free to travel backward and forward to load and fire the gun automatically so long as cartridges remain in the magazine.

Safe.

In the safe position the fire control lever is turned until the projection on its stem moves under the front of the trigger lever. The trigger is accordingly positively locked, but the trigger sear is left free to descend, to allow the gun to be cocked in the event of the trigger being set to "safe" when the breech was closed.

See Plate V.

- A. Indicator set to "Single-Fire", Trigger in normal position.
- B. Indicator set to "Single-Fire", Trigger pulled.
- C. Indicator set to "Auto-Fire", Trigger pulled.
- D. Indicator set to "Safe", Trigger cannot be pulled.

ACTION OF THE MECHANISM.

A magazine is placed on the gun, and the piston drawn back on to the trigger sear by means of the cocking handle. When the trigger is pulled, the piston, with the breech locking block, is thrown forward by the return spring to feed up and fire the first round. The bullet passes through the barrel and uncovers a small vent leading into the gas block, so that the gas impinges on the end of the piston rod and drives it to the rear against the pressure of the return spring.

The rearward movement of the piston rod first withdraws the firing pin (mounted on its pillar) away from the fired cartridge; then after a safety interval the side cams on the pillar force the locking block to tilt downwards into the unlocked position. The piston pillar then strikes the back wall of the locking block and carries it to the rear, thus extracting the empty cartridge case from the barrel. As the locking block commences its rearward travel its unlocking movement is continued by its rear end sliding down an inclined surface on the locking shoulder. This final movement downward, brings the locking block horizontal and settles it in front of a ramming lug projecting from the base of the piston pillar, thus engaging the locking block with the piston rod, during the rearward and return stroke.

The continued movement of the locking block along the receiver carries the cartridge case on to the ejector, which throws it out of the gun to the right. In the meantime, the cartridge feed piece, carried on the top front of the locking block, has deflected when passing under the new cartridge in the magazine and risen into a position to engage the base of the next cartridge on the return stroke.

At the end of the recoil stroke the mechanism is stopped by a spring buffer mounted in the butt. The return spring then pushes the mechanism forward to feed up and fire the next round.

The forward movement of the locking block pushes the lowest cartridge out of the magazine into the chamber, and forces its rim to engage behind the extractor. As the locking block approaches the end of its travel it rides over a cam projecting upwards from the bottom of its guide in the receiver. The upward movement thus imparted to the rear end of the locking block disengages it from the ramming lug on the piston, which latter continues its forward movement, after the locking block has been arrested by the cartridge in the chamber. This further movement of the piston then causes the cams formed on the piston pillar to slide along the inclined grooves in the locking block and so forces it to tilt upwards and engage its rear end in front of the locking shoulder in the receiver.

The piston then travels forward freely until the firing pin strikes the new cartridge in the barrel, when its motion is finally arrested by a solid stop formed in the receiver.

The resulting explosion again operates the mechanism which will continue to load and fire the gun until the trigger is released or until all the cartridges in the magazine are expended.

After the last cartridge of each magazine has been fed into the barrel, the magazine platform presses down the breech catch which engages with the locking block when at the end of its opening movement, thereby causing the breech to remain open.

The action of removing the empty magazine, disengages the breech catch and allows the mechanism to move forward until it is arrested by the trigger sear. The gun is therefore ready to fire again without re-cocking, as soon as a loaded magazine has been snapped into position.

Note.- Dummy cartridges should be carefully inspected before being run through the gun because it is difficult to close the breech on a live cartridge without firing it.

INSTRUCTIONS FOR DISMOUNTING & RE-ASSEMBLING.

To change barrels. Cock the gun. Turn the barrel locking pin on the left hand side of the receiver as far up as it will go, first pulling the knob outwards to release it from the receiver. Swing the barrel upwards on the receiver and shake it out.

Introduce the breech end of the new barrel into the receiver, keeping the muzzle elevated so that the radial ribs and grooves can engage. Swing the muzzle down into line with the receiver and turn the barrel locking pin back to the horizontal position.

Order of dismounting.

Start with breech mechanism closed.

- (1) Remove butt securing key and detach butt.
 - (2) Slide out the breech mechanism and separate it.
 - (3) Remove barrel.
 - (4) Remove the piston guide.
 - (5) Remove cocking handle.
- (1) Hold the gun in the left hand and press the butt downwards with the body. Turn the handle of the butt key downwards and pull it out.
- Remove the butt by bending it upwards and unhooking it from the receiver. Pull out the return spring.
- (2) Pull the cocking handle back smartly and the mechanism will slide out of the receiver. To separate it, draw the piston forward along the locking block and return it with an unhooking motion.
 - (3) Pull the barrel locking pin outwards to release it and turn it upwards as far as it will go to unlock the barrel. Swing the barrel upwards on the receiver, and lift or shake it clear of its bearings.
 - (4) Turn the barrel locking pin to its lowest position, i.e. knob resting on handguard, or level with bottom of receiver, remove the piston guide by a slight forward pull.
 - (5) Slide the cocking handle forward out of the guides in the receiver.

To assemble the gun reverse the foregoing operations.

The foregoing operations dismantle the gun far enough to permit thorough cleaning, but if necessary, the parts may be further separated as follows.-

Trigger gear. Turn the fire control lever downwards until it can be withdrawn from the frame. The left

hand side of the frame can then be taken off by moving its rear end outwards, thus exposing the trigger and sear. Depress the nose of the sear with the fore-finger and slide it out of the frame. Pull the trigger until its heel is above the edge of the frame, then apply side pressure to slide it out.

Proceed in the reverse order to assemble, taking care that the two springs are properly engaged on their seatings.

Extractor. Remove the locking block. Engage the blade of the special tool, or a small screwdriver, behind the flange at the back of the extractor spring and slowly lever it forward and outward. As the spring exerts considerable pressure care must be taken that the parts do not fly as they leave the locking block.

To assemble - place the front end of the extractor in its guide in the locking block, and force the spring, with the flanged guide, forward and down into the pocket.

Ejector. First remove the mechanism, then, with the forefinger of the right hand, force the front end of the ejector inwards until the rear part of its cover rises above the ejector seating, then slide the cover off to the rear.

Swing the ejector outwards on its axis until its trunnions can slide out of their bearings through the curved slots.

To assemble - introduce the ejector, rear end first, and engage the trunnions. Slide the cover into its dovetail and push it forward until the rear end clicks down into position.

Firing Pin. Dismount the mechanism. Turn the pin at the base of the firing pin until the notch coincides with its head. Remove the firing pin by tapping it out to the right.

To assemble - reverse these operations.

GENERAL INFORMATION.

Gas Regulator.

The regulator compensates for the difference in gas pressure arising from extreme heat or cold. It should not be altered unless the recoil of the mechanism is excessive or is too feeble to effect the correct working of the gun.

The regulator has on its right surface divisions numbered 0 to 3. As one or other of these divisions is brought opposite its spring catch, corresponding holes allow a greater or smaller quantity of gas to escape before reaching the piston. When set to 0 there is no escape, and the full pressure of the gas acts on the piston. The normal adjustment is with the regulator set at 2.

To adjust the regulator, place a full magazine on the gun and fire single shots at 45° depression. Turn the regulator with the special tool until the recoil is only just sufficient to cock the gun.

Loading Magazines.

Place the charger guide over the mouth of the magazine and insert a full rifle charger. Press the cartridges down into the magazine and repeat until a full load has been introduced.

When the charger guide is not available, strip the cartridges out of the chargers and introduce them one at a time into the magazine, pushing them well towards the rear.

After filling a magazine press the cartridges as far down as they will go and see if they rise smartly. If the action is sluggish the magazine is faulty or has been badly filled.

Loading the Gun.

Pull the cover of the magazine catch backward, thus releasing both the flap and the dust cover situated over the magazine opening; throw back the cover, introduce a full magazine by hooking the tooth projecting from its front surface into the recess in the magazine opening and then force it downwards until the catch engages. This operation can be performed with the breech mechanism either open or closed.

Firing.

Move the fire control lever on the trigger gear to "Single" or "Automatic fire" as required, pull back the

cocking handle as far as it will go and return it to the forward position. The gun is then ready for firing.

Note.- Misfires are liable to occur if the cocking handle is left in the rear position.

In firing from the prone position, pull the butt well back against the shoulder and grasp it with the left hand immediately behind the receiver. Do not strain forward towards the gun and do not attempt to hold it down.

Observation. When fire is interrupted during either "Single" or "Automatic fire", the breech remains open and there is no cartridge in the barrel. The same thing occurs when the magazine is empty.

When the last cartridge has left the magazine, the magazine platform will move downward against the breech catch and force it to engage the locking block and in this manner prevent it closing the breech.

To change Magazines.

Release the trigger, then release the empty magazine by pushing the flap of the catch forward. Mount a full magazine and the gun will fire as soon as the trigger is pressed.

On ceasing fire.

Release the trigger, remove the magazine, cock the gun twice and close the breech. Close the magazine opening and fold back the flap of the catch. Close the ejection port with its cover and fold the legs up against the barrel. Place gun in case.

Use of Front Support.

When the position chosen allows the legs to be used, pull them forward as far as they will go to unlock the hinge and then swing them down into the firing position.

To replace them, pull them outwards as before and swing them back against the barrel.

INCIDENTS DURING FIRING.

(1) Misfire.

To clear a misfire, pull the cocking handle right back

to the rear, then return it to the forward position, when fire may be continued. If the fault occurs several times examine the firing pin and see that there is no obstruction in the receiver. When the bullets of the ejected cartridges are found to be bruised at the point, the magazine is defective and should be discarded.

(2) Failure to eject.

Cock the gun, turn it over to the right and shake the case out of the ejection port.

If repeated, partly withdraw the mechanism and see if moderate pressure applied with the point of a bullet, will force the ejector toe out to the edge of the recess in the breech block. If so, change the ejector. If the ejector is found satisfactory, then the extractor spring is too weak and should be changed.

(3) Failure to feed.

If the cartridge is only half entered in the chamber, cock the gun, remove the magazine, and shake out the loose cartridge. If repeated discard the magazine.

(4) Non-extraction.

Remove the magazine, close the breech sharply and re-cock. If this fails, change the barrel and drive out the case with a cleaning rod.

(5) Separated Cases.

Remove the magazine. Introduce the special extractor into the chamber and close the breech on it. Re-cock the gun to extract and eject the broken case.

(6) Trigger.

If the trigger is pulled without the barrel locking pin being returned to the normal position the gun will not fire, as the forward movement of the piston is arrested by the cocking handle.

NOMENCLATURE OF PRINCIPAL COMPONENTS.

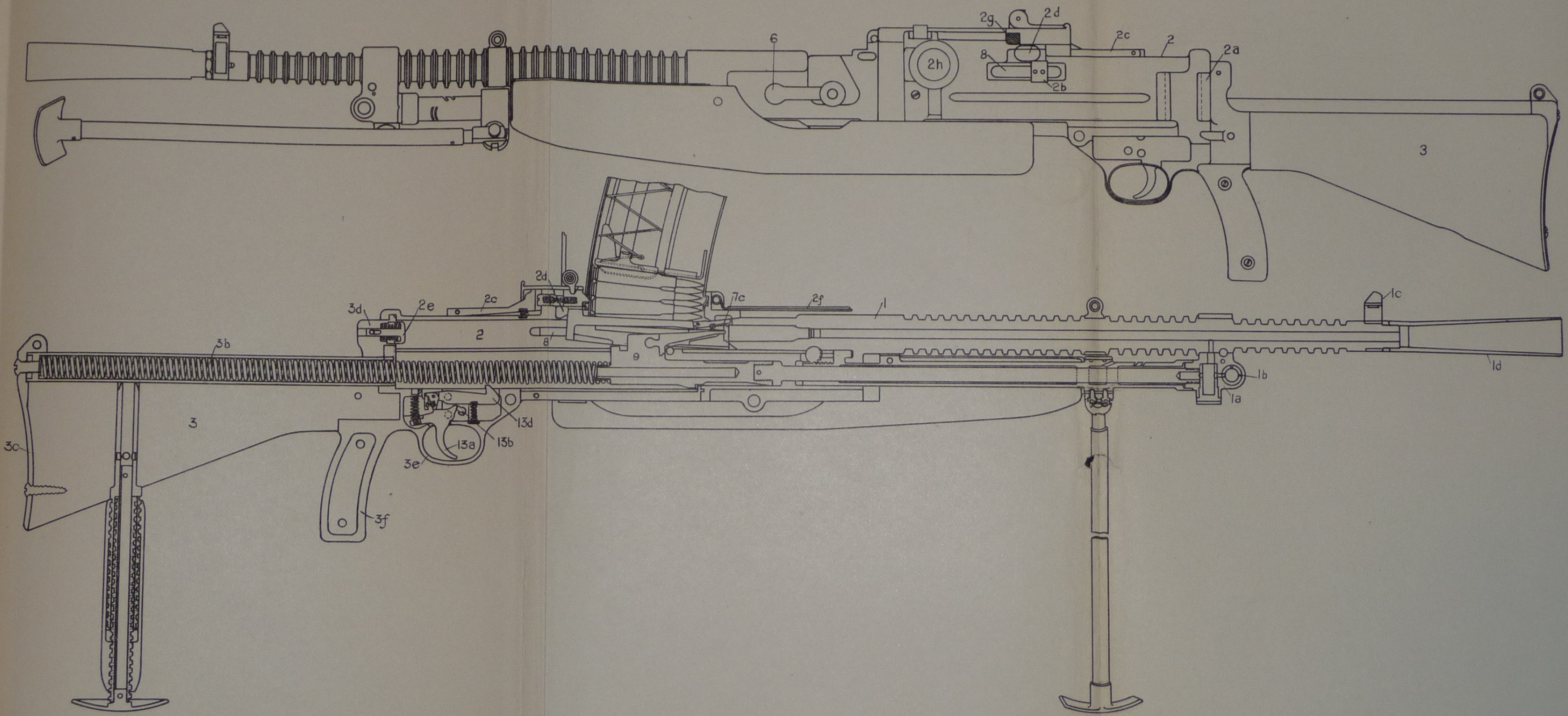
SEE PLATES II, III, IV AND V.

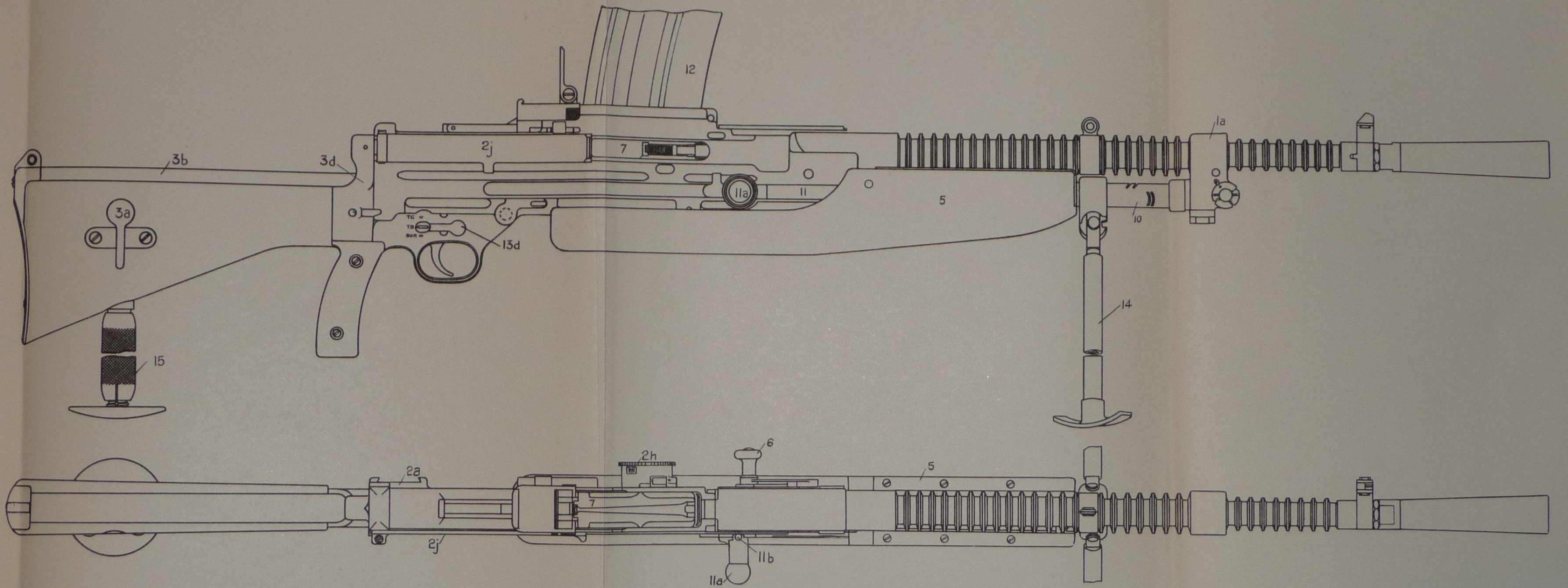
<u>Principal Parts.</u>	<u>Components.</u>
1. Barrel.	(1.a. Gas Block. (1.b. Regulator. (1.c. Fore Sight. (1.d. Flash Tube.
2. Receiver.	(2.a. Seating for Optical Sight. (2.b. Ejector Cover. (2.c. Breech Catch. (2.d. Locking Shoulder. (2.e. Buffer. (2.f. Dust Cover (Magazine Open- ing). (2.g. Magazine Catch. (2.h. Rear Sight. (2.j. Ejection Hole Cover.
3. Butt.	(3.a. Catch securing Rear Sup- port. (3.b. Return Spring Tube. (3.c. Butt Plate. (3.d. Butt Block. (3.e. Trigger Guard. (3.f. Pistol Grip. (3.g. Butt securing Key.
4. Return Spring.	
5. Handguard.	
6. Barrel Locking Pin.	
7. Locking Block.	(7.a. Extractor. (7.b. Extractor Spring. (7.c. Cartridge Feed Piece.
8. Ejector.	

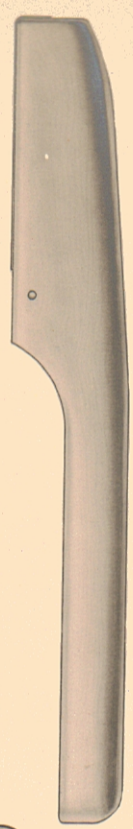
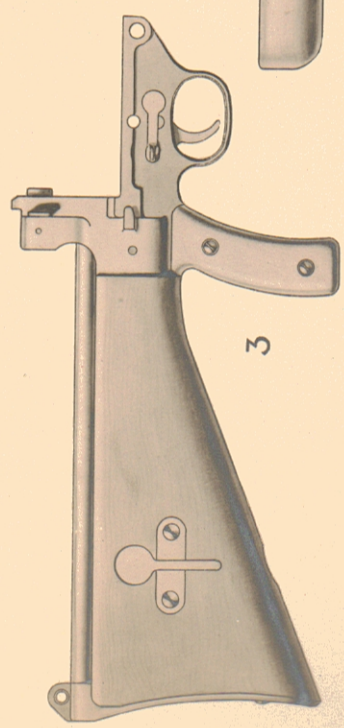
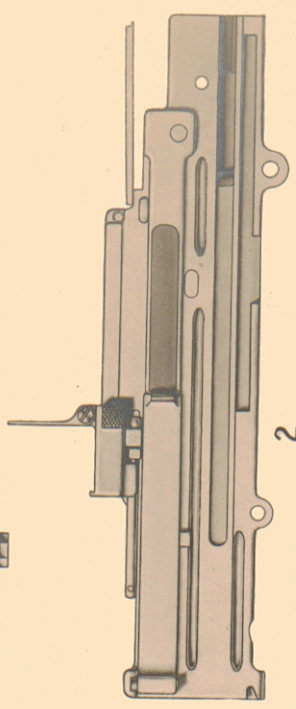
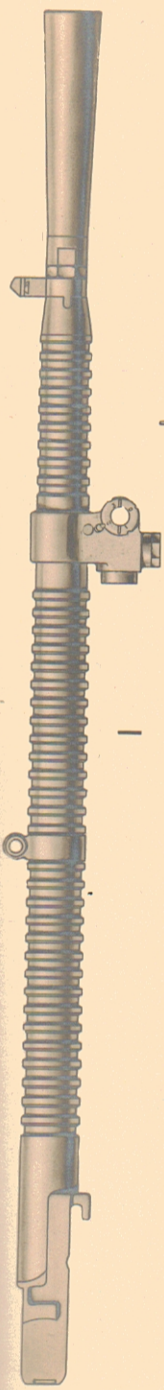
Principal Parts.

Components.

- | | |
|---------------------------|-------------------------------|
| 9. Piston. | (9.a. Firing Pin. |
| | (9.b. Firing Pin Fixing Pin. |
| 10. Piston Guide. | |
| 11. Cocking Handle. | (11.a. Cocking Handle Knob. |
| | (11.b. Knob Axis Pin. |
| | (11.c. Knob Spring. |
| 12. Magazine. | (12.a. Magazine Spring. |
| | (12.b. Magazine Platform. |
| | (12.c. Magazine Cover. |
| 13. Trigger Gear. | (13.a. Trigger Lever. |
| | (13.b. Trigger Sear. |
| | (13.c. Trigger Sear Pawl. |
| | (13.d. Fire Control Lever. |
| 14. Legs (Front Support). | |
| 15. Rear Support. | |







III





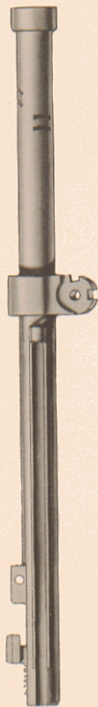
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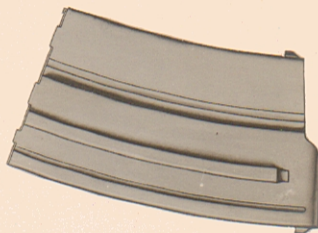
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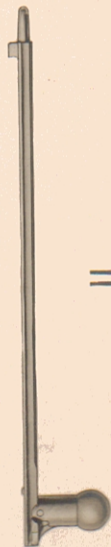
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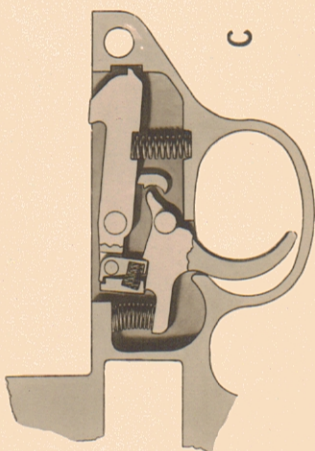
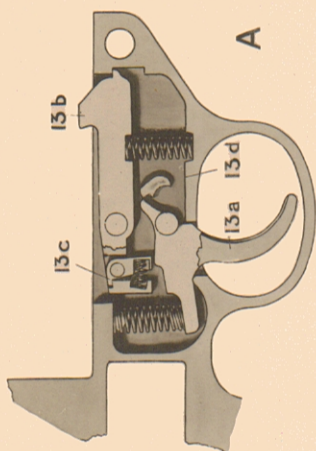
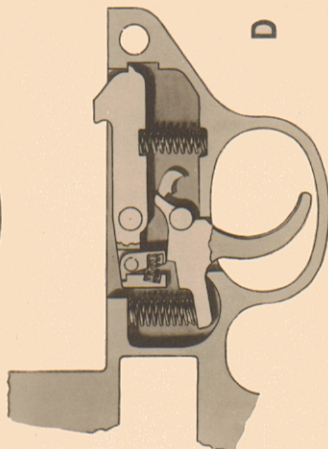
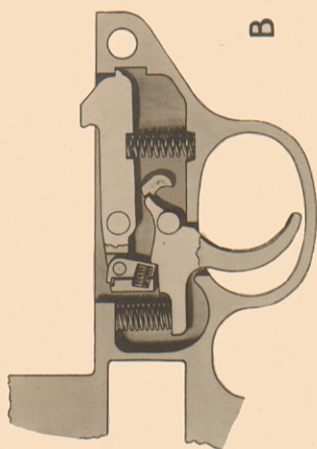


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IV





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